

PATENT SPECIFICATION



Convention Date (Germany): March 11, 1933.

435,041

Application Date (in United Kingdom): March 12, 1934. No. 7794 / 34.

Complete Specification Accepted: Sept. 12, 1935.

COMPLETE SPECIFICATION.

Improved Method of Effecting Adhesion or Cementing of the Surfaces
of Materials.

We, I. G. FARBENINDUSTRIE AKTIEN-
GESELLSCHAFT, a joint stock company
organised under the laws of Germany, of
Frankfort-on-Main, Germany, do hereby
declare the nature of this invention
and in what manner the same is to be
performed, to be particularly described
and ascertained in and by the following
statement:—

10 This invention relates to an improved
method of effecting adhesion or cementing
of the surfaces of materials of all
kinds. The method can be employed for
uniting surfaces of pasteboard, vul-
canised fibre, textiles and in particular
wood.

It is already known to glue or cement
together wood, in particular ply-wood and
furniture wood by employing aqueous
20 solutions of condensation products of
urea, thiourea or derivatives thereof and
aldehydes of polymers thereof, and also
hardening agents, such as acids, acid
salts or substances which split off acids.
25 In these known processes a mixture of
the condensation product and the harden-
ing agent is applied to the surfaces to be
cemented. When a hardening agent
which acts comparatively slowly is used
30 the adhesion requires a correspondingly
long setting period. If, however, a mix-
ture of a quickly acting hardener with
the adhesive is resorted to, the mixture
sets prematurely and, for example, when
35 employing the mixture for cementing
large surfaces the portion first applied
hardens before the whole surface to be
cemented is covered.

In accordance with the present inven-
40 tion the above mentioned disadvantages
are avoided. The method of this invention
includes the operation of applying
separately to the surfaces to be cemented
together or to one of them as an adhesive
45 a condensation product of urea or thiourea
with an aldehyde and a hardener for this
condensation product.

Among the compounds suitable as
hardening agents for the aldehyde urea
50 condensation products may be men-
tioned acids, such as hydrochloric acid,
sulphuric acid, phosphoric acid and
acetic acid, oxalic acid, lactic acid,

acid, acid salts, such as acid sodium sul-
phate, mono ammonium phosphate and
aluminium chloride and substances splitting
off acids when incorporated in the
adhesive mixture, such as ammonium
chloride and ammonium sulphate.
Further additions, such as for example
starch, potato flour, ground potato flakes
or fillers of the most varied kinds can be
incorporated with the adhesives.

In order to carry out the cementing pro-
cess of this invention a hardening agent,
preferably in a viscous state, (to prevent
penetration to any marked extent into a
material to be cemented) is with advan-
tage applied as a thin layer, then the
aldehyde urea condensation product pre-
ferably in aqueous solution is brushed on
and the materials to be cemented are
finally pressed together. When cement-
ing materials where a penetration of the
adhesive should be avoided, for example
when inlaying precious woods, it suffices
55 to apply the hardening agent, as also the
adhesive, to one side only of the surfaces
to be cemented. In the case of thicker
working materials, in which a penetra-
tion has no disadvantageous influence, the
hardening agent and adhesive can be
applied to both surfaces to be cemented.

The separate application of adhesive
and hardening agent can likewise be
carried out in such a manner that the
adhesive is applied first and the adhesive
layer is then coated with a mobile solu-
tion of the hardening agent, for example
by spraying.

The invention is illustrated by the
following example:—

EXAMPLE.

A solution of 20 parts by weight of
ammonium chloride in 80 parts of water, 95
advantageously with the addition of a
thickening agent, such as for example
hydrolysed starch, is applied in the
thinnest possible layer to both sides of a
middle layer of pine wood. A solution 100'
of a formaldehyde urea condensation pro-
duct is then applied, produced as
follows:—

200 parts by weight of a 30% aqueous
solution of formaldehyde are heated to 105°
95° C., with 0.1 part by weight of mono

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sodium phosphate. A solution of 60 parts by weight of urea in 30 parts of water heated to 70° C. is added to the above solution. After the addition of 5 0.15 part by weight of trisodium phosphate the solution is evaporated in vacuo at a temperature below 50° C. until a 35% solution of the condensation product is obtained.

10 Immediately after applying the two solutions two binding layers of veneer are laid on and then pressure is applied for 1½ hours at the ordinary temperature. The resulting cemented material possesses 15 a stability not attainable with other cold acting glues or cements.

The hardening solution, which is ammonium chloride in the present example, can equally well be applied to 20 the middle layer of pine wood as also the covering layers of veneer, if desired also to all the surfaces to be cemented. This applies also to the use of the formaldehyde urea condensation product.

25 The process can likewise be carried out in such a manner that the formaldehyde urea condensation product is first applied to the surfaces to be cemented and then the ammonium chloride solution is introduced, advantageously by spraying.

The joining together of the surfaces to be cemented as treated above can also be accomplished in the known manner at a raised temperature for example 30 within a temperature range up to about 150° C.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a process for effecting adhesion the method consisting in applying separately to the surfaces to be cemented together, or to one of them, an aldehyde urea condensation product, in particular a formaldehyde urea condensation product and a substance exerting a hardening influence thereon.

2. Process as claimed in claim 1 in which acids, acid salts or substances which after incorporation with the adhesive mixture yield acids are employed as hardening agents.

3. Process as claimed in any of the preceding claims in which filling materials are caused to be incorporated in the adhesive layer.

4. Process as claimed in any of claims 1–3, in which the hardening agent is first applied and then the aldehyde urea condensation product applied on the hardening agent.

5. Process as claimed in any of claims 1–3 in which the aldehyde urea condensation product is first applied and then a solution of the hardening agent applied thereon, for example by spraying.

6. Process as claimed in any of the preceding claims, in which the cementing is accomplished at room temperature.

7. Process for effecting adhesion substantially as described in the example.

Dated the 10th day of March, 1934.
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